

This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

**Usage guidelines**

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

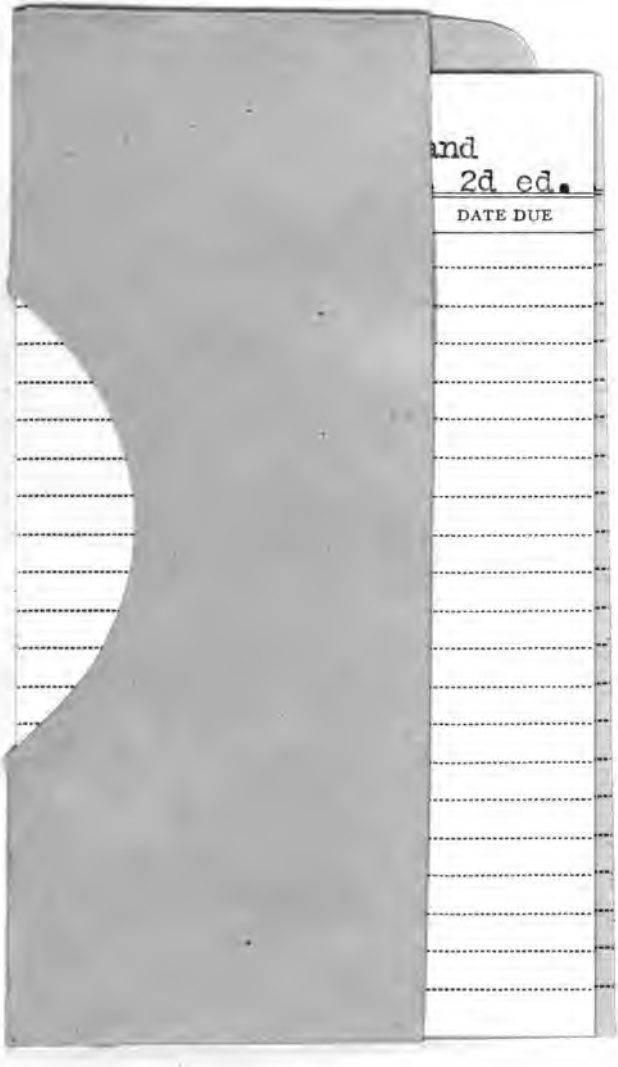
**About Google Book Search**

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

LANE MEDICAL LIBRARY STANFORD
L683 .B62 1907 STOR
Heart disease and blood-pressure : a pra
24503424850

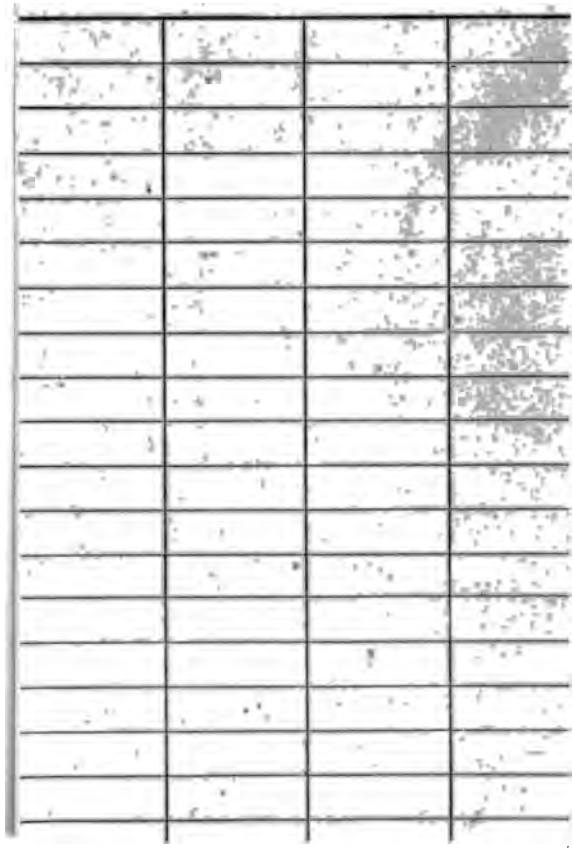
# HEART DISEASE
*and*
# BLOOD PRESSURE

L. F. BISHOP


nd
2d ed.
DATE DUE

Medicine

Date Due



# HEART DISEASE
AND
# BLOOD-PRESSURE

*A Practical Consideration of Theory and Treatment*

BY

LOUIS FAUGERES BISHOP, A. M., M. D.

Clinical Professor of Heart and Circulatory Diseases, Fordham University, School of Medicine, New York City; Physician to the Lincoln Hospital; Late Chairman of the Section on Medicine of the New York Academy of Medicine; Member of the New York Pathological Society; the Neurological Society; Alumni Association, St. Luke's Hospital, etc.

*SECOND EDITION*

New York

E. B. TREAT & COMPANY

241-243 West 23d Street

1907

COPYRIGHT
BY E. B. TREAT & CO.
1904 and 1907

062
907

## PREFACE TO SECOND EDITION

DURING the four years that have elapsed since the first edition of this book was written a wide interest in the subject has developed, and the concentration of the work of the author on the heart and circulation as a specialty has resulted in certain further conclusions which he is anxious to submit to the judgment of those who received so kindly the first edition. In a chapter on "The Vessel Tone-maintaining Function of the Central Nervous System" will be found a physiological doctrine which does not appear in the literature of the day but which would seem the key to the explanation of a large number of cases. Reading with this theory in mind, it has often seemed that an author must have had the idea in view but not quite clearly enough to state

it. The chapter on "Hypertonia Vasorum Idiopathica" is a discussion of the clinical application of the theory to an important class of cases. The title of the book has been slightly changed, because it was found that "Blood-Pressure" alone conveyed the idea only of laboratory physiology while in fact the book was taken up with the consideration of cases that are popularly called "heart disease."

The author has been much gratified by the attention given to his classification of disorders of blood-pressure and by the frequent reference by writers on blood-pressure to the condition described by him in a paper reprinted on pages 87-90 describing "Constitutional Low Arterial Tension."

L. F. B.

No. 54 West 55th Street
New York

# PREFACE

THE publication of a treatise on blood-pressure at a time when so much has been learned, and so many books are appearing on the subject, demands a note of explanation.

My excuse is that for the past fifteen years, indeed, ever since as an hospital interne I first came in contact with patients suffering from serious disease in which the circulation was involved, the question of the vital relations of the physics of the circulation has been one of the most interesting problems that has constantly presented itself in the domain of clinical medicine. During this time the care of patients suffering from those diseases and conditions in which the fight for life was a contest with progressive circulatory failure, has formed a serious part of my work.

It is a fact that is constantly appearing in the literature of the day, that circulatory disease, as represented in statistics of disease of the heart and disease of the kidneys, is relatively more frequent than formerly. It is undoubtedly true that under the strain of modern life, many other causes of disease having been eliminated, disorders of the circulation dependent upon altered blood-pressure have become very important.

Just as tuberculosis has for its victims the most attractive of the youth of the land, so high arterial tension claims the best and most successful of those past middle life who have borne the weight of the strenuous demands of a modern career. Much attention is now being directed to tuberculosis because its cause and progress have become a matter of public knowledge. The victims of circulatory disease, however, still too often go for months and years without intelligent treatment because no one has pointed out to them the danger signals and

the signboards which point to the destruction to which they are tending.

Admirable as is the work of the rescue of the young, who may or may not become citizens of marked usefulness, how much more important to the community is it if some years can be added to the career of the mature and trained worker.

The subject of the mechanical measurement of the actual pressure in the vessels has not been considered, as that is so well discussed in other works, and it was here wished to emphasize the clinical relations of blood-pressure as interpreted in the light of clinical experience. There is an over-respect in these days for so-called *scientific work,* wrongly limiting the term to that which is in some way connected with a laboratory and apparatus. This is a narrowness of recent times. There are many sciences besides mathematics, experimental biology, and chemistry, and if clinical workers yield the field of medicine

entirely to the so-called research workers and the laboratory men, there is certain to be a halt in the progress of the art of medicine as it bears upon the wise management of the individual during the course of his life.

These are the reasons for the publication of the conclusions which are the result of clinical work upon a subject which is being well considered from a mechanical and laboratory point of view.

L. F. B.

# CONTENTS

I. Alterations of Pressure in the Blood-Vessels . . . . . 13

Importance of a proper relation between pressure in the arteries, resistance in the arterioles, and pressure in the veins; physiologic alterations; the error of comparing the circulation in the body to the passage of water through pipes; the arterial system as a reservoir; importance of the consideration of the evolution of the circulation; the author's classification of cases of circulatory disease.

II. Primary Low-Pressure Cases . . . . 22

Similar symptoms often produced by anemia and congestion; importance of a proper movement of the blood; valvular disease as a cause of low arterial tension; weakness and strain of the heart-muscle as a cause of low arterial tension; prostration of the circulation as a cause.

III. The Management of Primary Low-Pressure Cases . . . . . 27

Treatment dependent upon the cause of the condition; importance of iron,

arsenic, hypernutrition, and exercise; management of valvular cases in their early stage; use of iodid of soda; importance of the vitalizing effect of diet and climate.

IV. HIGH-PRESSURE CASES . . . . . 32
Defined as cases in which there is undue resistance in the circulatory path of the blood; term not confined to cases in which high-pressure is always actually present; high-pressure cases not converted into low-pressure cases, but into secondary low-pressure cases; management of high-pressure cases one of the most important problems of modern times; early indications of this condition often referred to the brain, heart, digestive and other organs.

V. THE MANAGEMENT OF HIGH-PRESSURE CASES . . . . . 42
The removal of the exciting cause; alcohol not always contraindicated; hydrotherapeutics discussed; Nauheim treatment; health resorts; importance of vacations and the cultivation of the capacity for the enjoyment of them; the effect of temperament on the progress of high-pressure cases; the drug treatment of high arterial tension not altogether satisfactory; dangers to be anticipated.

VI. Some Obscure Symptoms of Circulatory Disorder, with a Consideration of Their Significance . . . . . 55

Head noises in elderly people; slight attacks simulating paralysis; pain in various parts of the body; how distinguished from other pains; congestion of the liver; chronic congestion of the lungs; mania; change in disposition; convulsions; the relation between neurasthenia and circulatory disturbances.

VII. The Management of Secondary Low-Pressure Cases . . . . . 62

The element of constitutional treatment most important; the necessity for a closer study of the therapeutics of these cases; the effect of exercise.

VIII. General Considerations . . . . 68

The importance of treatment in the early stages of arterial degeneration; the relation of nature's provision for heart stimulation and control to the use of cardiac drugs in acute disease; the importance of considering the element of vasomotor instability in estimating the significance of irregularities of cardiac rhythm; discussion of the author's views by Dr. Albert Abrams; constitutional low arterial tension; prostration of the circulation.

IX. THE ESTIMATION OF BLOOD-PRESSURE AND THE USE OF THE NITRITES FOR ITS MODIFICATION . . . . . 95

Observation of the pulse a matter in which great skill exists not to be entirely supplanted by instrumental determinations.

X. THE BLOOD-VESSEL TONE-MAINTAINING FUNCTION OF THE BRAIN . . . . . 112

The vital importance of the tonus of the blood-vessels to life; the great capacity of the dilated blood-vessels; the central nervous control of vessel tonus in the higher animals; the existence of a tone-maintaining function in the human brain analogous to a similar function affecting the voluntary muscles; the relation of this function to the vaso-motor center in the medulla; its importance in clinical medicine.

XI. HYPERTONIA VASORUM IDIOPATHICA . . . 116

A disease not formerly recognized as having an independent existence; it attacks the most useful members of society; description of a typical case; it may result in apoplexy, sudden heart failure, or Bright's disease; medical treatment very important and drugs of great value.

# HEART DISEASE

AND

# BLOOD-PRESSURE

## CHAPTER I

### ALTERATIONS OF PRESSURE IN THE BLOOD-VESSELS

PRESUPPOSING a knowledge on the part of the reader of the systematized facts concerning disease of the heart and blood-vessels, and some actual experience in the treatment and care of patients, we approach the subject of disorders of the circulation from the viewpoint of the consulting room and the hospital ward, rather than from that of the library, the pathologic laboratory, and the classroom.

We find immediately that we have to deal for the most part with slowly developing or long-established conditions. The study of acute disease is of great importance, particularly to the beginner in practice who desires to hang an item of experience upon each peg of recently acquired knowledge, but in actual

practice, on the principle of the greatest good to the greatest number, the attentive study of chronic disease is at least equally necessary.

Alteration of pressure of the blood in the vessels constitutes the most striking disorder of the general circulation, and upon a study of its causes, effects, and control, will be built this entire consideration of the subject. Indeed, the whole mechanism of the circulation has to do with the maintenance of high-pressure or low-pressure in one part or another of the vascular system as may be demanded.

It is easy to see that the maintenance of the circulation is not a question of the degree of tension in any part of the circulatory system, but of a proper relation in tension between pressure in the arteries, where the blood is stored, and the points at which it is needed. It is usual, however, to study the question from the standpoint of the arteries. In most cases it is only late in circulatory disease that venous pressure becomes of importance. The freedom of passage between the arteries and veins through the arterioles and capillaries is of extreme importance.

In health the physiologic relations of blood-pressure are instructive. The effect of muscular exercise on blood-pressure is at first to raise arterial pressure, but finally after the exercise has been continued for some time, the pressure falls again to normal. The same is true in regard to the effect of mental effort.

During the existence of this increase of arterial pressure due to exercise, there is a large amount of blood in the arteries. This is obtained from the large veins in the abdomen, which act as a source of supply from which, in health, blood can be drawn to flush any part of the arterial system. This tide of blood between the digestive organs and the systemic area is illustrated in many ways. Thus, the coldness after eating indicates that the tide has set toward the digestive organs. The indigestion following exercise after eating, and even more markedly the indigestion following strong emotion after a meal, shows that the tide has set the other way. The lethargy and mental inactivity of those who habitually overeat, and the tendency to indigestion of mental workers, indicate the same thing. The relation between

the circulation in the abdomen and the circulation in the brain is an intimate one. The proverbially good mental condition in patients suffering from acute peritonitis may very well be due to the spasm of all the abdominal muscles that prevents the accumulation of large quantities of blood in this part of the body.

The impression of the circulation obtained by one's early study of physiology is erroneous. It resembles too closely the idea of a series of closed pipes, as in the plumbing of a house, the water entering at a large pipe, going through a system of smaller pipes, and after having been used in certain fairly definite receptacles to be collected by a similar set of pipes which convey it to a common outlet. Of course, in a house the circle is not complete, as the water does not again re-enter. In general, however, that is the conception of the arrangement that is obtained by the average teaching of physiology.

The facts, however, are very different in the human body. The arterial system is really a reservoir of blood in which the area of a cross

section of the combined vessels very rapidly increases from the heart outward. In this series of passages the blood is contained and held under pressure by a muscular envelope. From this reservoir the blood escapes for use, through the arterioles and capillaries, and the office of the heart is to pump into this reservoir sufficient blood to maintain the pressure depleted by the blood used by the capillaries. This naturally creates a flow of blood from the heart toward the periphery, but the immediate use of the heart is to maintain this arterial pressure.

This is well shown by the fact that the actual amount of blood propelled by the heart varies greatly, according to the demand for fresh blood on the part of the body. During exercise, when the peripheral vessels are open, and there is a drain on the arterial system, the heart works harder to supply the deficiency. Thus the arrangement and movement of blood in the body are seen to be more like a system of irrigation than of circulation, there being a reservoir with numerous branches from which the irrigating fluid is distributed, and a system

of conduits by which it is collected to be again transferred to the storage place.

The idea of the office of the veins as a storehouse of blood is a very old one, and one which has had much influence upon therapeutics. The consideration of the arterial system as a similar reservoir in which suitable pressure is maintained by the muscular elements which go to make it up, seems to have been overlooked. The truth of the fact that the arteries form a reservoir rather than mere conduits is shown by the fact that arterial pressure is practically uniform throughout the arterial system. This means that the blood moves with the utmost freedom throughout the arteries, and that the movement of the blood is controlled, not by pressure from behind, but by the escape of blood from in front.

The arterial system is thus like a reservoir analogous to the tubular boiler of some types of engines. It is a hollow ramifying organ containing a vital fluid, the capillaries being the ducts. Whenever there is a demand for this vital fluid in any part of the system, the muscular covering of the organ contracts, the

arterioles which lead to the proper capillaries dilate, and the demand is supplied. The demand upon this organ for the vital fluid is so great that a special mechanism, represented by the heart, conducts the vital fluid from the places where it is manufactured, and the lungs where it is purified, to the high-pressure receptacle from which it is used.

This conception of the arterial system as a high-pressure receptacle for the blood, is well borne out by a study of the evolution of the circulation in the lower forms of life, where there are first found small interstices in the tissues through which the blood ebbs and flows in an irregular manner. As we ascend the scale the blood is found in more definite receptacles until finally we reach the complex arrangement found in man.

The action of the vascular system is, on a large scale, not different in principle from that of a secretory gland adapted to the unusual demand for its contained fluid.

The so-called circulation of the blood was discovered very late in the history of man, and students have become so fascinated with the

mechanical beauty of the whole arrangement that they have allowed the mechanical idea to outweigh the realization of a living organism. It is the old truth of the pendulum which has swung too far when once started by Harvey. We need to return a little to the earlier conception, which considered more the function of the blood in particular parts of the body than its circulation.

In all studies of blood-pressure it must be remembered that the blood is subject to the laws of hydrostatics, and that the force of gravity must be discounted.

There are two great groups of cases which may well be called low-tension cases and high-tension cases, and a third group of secondary low-tension in which there has been a preceding high-tension.

The low-tension cases are all those in which inflammation or degeneration of the heart muscle itself, its envelopes or its valves, has primarily interfered with the blood-propelling function of the heart.

The high-tension cases are all those in which disorder of the arterioles, due to toxemia or

other causes, has brought about an unreasonable demand on the part of the system for a high-tension in the arterial reservoir to determine the proper supply of blood to the tissues.

It is particularly important from the point of view of practical physicians to distinguish between the two great groups of circulatory disease, both in their early and in their late development, because there is an essential difference in their management.

Low arterial tension as a terminal stage of high arterial tension, must, of course, be considered in the light of its development, but is of so great importance that we have studied it by itself.

# CHAPTER II

## PRIMARY LOW-PRESSURE CASES

DISORDERS of the general circulation are generally first recognized when some particular portion of the body becomes the seat of a marked congestion or anemia. It is under these circumstances that symptoms arise.

Anemia and congestion often produce symptoms that are strikingly similar. Delirium may be the result of congestion of the brain, but it may likewise result from anemia. Dyspnea may be an accompaniment of congestion of the lungs, but a deficient blood supply is its most common cause. Acute congestion of the kidneys causes suppression of urine, while diminished blood supply causes deficiency of secretion.

The effect upon an organ is a matter of the proper supply of fresh blood, not merely of a greater or less amount of blood being in the

vessels of the organ. This explains beautifully the effect of local therapeutics, such as the removal of a small quantity of blood, or the institution of some form of counter-irritation, the result of which is to start a stagnant local circulation. There is, however, little gain from the treatment of local congestion or anemia without attention to the general circulation in cases where the cause is general. Hence the extreme importance of recognizing which cases are of purely local origin, and which have their origin from the general circulation.

In this study of the circulation we will not include an extensive consideration of the inflammatory diseases of the heart, but will concentrate our attention upon those conditions which we are most often called upon to treat, and leave to the more comprehensive treatises the systematic consideration of the morphology of heart lesions and the discussion of physical signs.

During the acute stage of valvular disease, in the large majority of cases, circulatory failure does not become a matter of special anxiety. Low arterial tension usually shows itself

when the patient resumes his ordinary occupation.

The symptoms are practically the same for all forms of valvular lesions, although different in degree. Indeed, it is more often an academic than a practical question to decide which valves are at fault. Much more important is the question whether the defect has been properly compensated, and whether this compensation can be maintained. In general, however, it may be considered that in aortic disease the defective circulation is more strikingly due to an insufficient supply of blood in the arteries, and in mitral disease to an increased pressure in the veins, both resulting in a diminution of the difference in pressure in the arteries and veins, upon which the proper passage of the blood through the tissues depends.

The belief, so firmly held by many, that cardiac disease is usually confined to the left side of the heart is not borne out in practice. The most serious and fatal disorders involve the right side of the heart. This belief that the left side of the heart was almost the sole suf-

ferer from heart disease, was founded upon an old pathology which regarded chiefly the valvular deformities.

It is true that inflammation and distortion of the valves is almost entirely confined to the left side of the heart, but it is likewise true that both sides suffer equally in the incompetencies of the valves that come from strain or weakness of the heart-muscle as seen in very many cases of disorder of the circulation.

The left side of the heart can be markedly deficient in mechanical detail or physical structure, and the patient may get along fairly well until dilatation involving the right side of the heart takes place, with tricuspid regurgitation and its resulting venous engorgement.

It is necessary to remember that low arterial pressure is only to be regarded as pathologic when it is so little above venous pressure that the tissues and organs are not properly supplied with blood. There are instances where the heart is perfectly able and willing to produce more arterial pressure, but the peripheral circulation is so relaxed that it is not needed.

We get true low-pressure cases when

the pressure-producing mechanism has failed. These are primary when there has not been a previous over-demand for pressure.

Low blood-pressure due to general prostration is not to be regarded as a disorder of the circulation except in so far as the circulation fails to respond to demands made upon it. Thus in shock it is the nervous system that is at fault, not the circulatory apparatus.

# CHAPTER III

## THE MANAGEMENT OF PRIMARY LOW-PRESSURE CASES

THE indications for treatment in disorder of the circulation characterized by deficiency in pressure in the blood-vessels which is primary in that it has not been preceded by high arterial tension, are simple, though the elaboration of the management of each case will tax the judgment and ingenuity of the physician.

When there is no defect in the valves and no tendency to obstruction in the arteries, the condition is usually a weakness of the heart, and much may be accomplished by iron, arsenic, and hypernutrition, by increasing the number of meals, and by outdoor exercise.

When low-pressure is due to valvular disease we must consider the care of the heart before the establishment of complete compensation, during compensation, and in cases of broken compensation.

In the early days of a newly acquired valvular lesion, prolonged rest in bed with the very gradual resumption of a more active life, will enable both the heart and the body in general to adapt themselves to the new conditions. Of necessity there must be a compensatory hypertrophy, but it is not to the advantage of the patient that the hypertrophy be excessive, hence the desirability of such gradual resumption of active work. Until subjective symptoms and objective signs of defective circulation have disappeared, the patient must be restricted to a very quiet existence.

The use of drugs at this time is usually inadvisable, yet in cases of long-delayed compensation digitalis may be used.

When compensation is established and proper pressure in the arteries maintained, these cases may still be classed in the category of low arterial tension because of their tendency to this condition, just as we consider cases of Bright's disease as being high-pressure cases even when the condition is not actually present at the time.

During the stage of compensation, which

may be of long duration, the patient should lead a well-regulated existence—physical over-exertion, mental over-anxiety, and dissipation of all kinds must be avoided. Not only is a quiet life necessary when conscious symptoms are being caused, but also on account of the tendency, without conscious symptoms, to the production of excessive hypertrophy, leading in the end to degeneration. The occasional use, during the stage of compensation, of the iodid of soda as a means of preventing degeneration of the hypertrophied heart, is a useful procedure even when no other drug therapy seems advisable.

The treatment of low-tension resulting from ruptured compensation in a valvular case free from the taint of arterial resistance, often consists principally in rest in bed with particular care of the alimentary canal, no drugs being used at all. If the attack be more severe, with congestion of the kidneys and edema of the extremities, digitalis should be used for a time.

It is interesting to note that when a system of treatment has proved applicable to a particular form of disease, very soon its application

becomes extended to other diseases. The cure of tuberculosis is acknowedged to be a matter of the re-establishment of certain forces in the physical economy, the breaking down of which renders the patient susceptible to the disease.

In the progress of cardiac disease there are many elements that are not unlike the advance of tuberculosis. The term "cardiac cachexia" has been applied to a form of this condition accompanied by congestion, but it might well be extended to include the deterioration of fiber which leads to failure of the circulatory apparatus. In tuberculosis the connection between the cachexia and the disease is so evident that its hygienic management needs no advocate. It is equally true that the progress of circulatory disease is often dependent upon nutritional causes, and that the hygiene of tuberculosis in its demand for fresh air is equally important to the cardiac patient.

The vitalizing effect of fresh air in these cases will more than counterbalance the dangers of catching cold, although care is necessary when inflammation or congestion of the

kidneys is present. The patient can be trained to sleep with open windows.

Concerning warm bathing, it seems to be a fact that there is much less danger of taking cold than was formerly supposed. This fear is a tradition handed down from an age when bathtubs were more of a curiosity than they are in modern times. Our ancestors considered the taking of a hot bath before going out, a serious risk. Now, this is something that is done by thousands of people every day without bad results. It seems that the risk of exposing the body to changes of temperature after the bath rapidly diminishes when the patient has become accustomed to regular bathing.

Low-pressure due to degeneration of the heart-muscle which has not been preceded by hypertrophy is not at all common except in connection with acute or chronic general disease. The treatment in these cases is that of the general disease. But little is accomplished by measures directly influencing the circulation. The same is true of the heart overloaded with fat. Treatment must be hygienic, though the defective heart-muscle demands special precautions.

# CHAPTER IV

## HIGH-PRESSURE CASES

By high-pressure cases in contradistinction to low-pressure cases are meant all those circulatory disorders which are characterized by undue resistance in the circulatory path of the blood. It is not necessary, for cases to be classed in this category, that actual high-pressure should always be present in the blood-vessels. It is enough that there is a tendency toward the necessity for abnormal high-pressure for the proper circulation of the blood.

High-pressure cases comprise all instances in which degenerative disease of the blood-vessels or kidneys, or toxemia causing disordered action of the same, and resulting in high arterial tension, precedes or goes hand in hand with the development of cardiac disease.

Low-pressure cases occasionally become high-pressure cases, as when valvular disease

of the heart causes secondary Bright's disease. High-pressure cases, however, are not converted into low-pressure cases, as a sharp distinction must be drawn between primary and secondary low arterial tension.

The management of high-pressure cases, which includes a large proportion of the slowly developed diseases incident to the overwork and luxury of modern times, is relatively more important than that of the low-pressure cases. It is particularly important to detect the earliest development of a tendency to high arterial tension because at this time it is more amenable to treatment.

Disorder of the general circulation is the great factor which has to do with the limitation of life in all persons who escape those causes of death which are more or less accidental, so when local disease is eliminated, duration of life depends upon the integrity of the heart and blood-vessels.

As implied above, in this class of cases the heart, blood-vessels and kidneys go hand in hand, and serious disease of one is not found without involvement of the others. Hence the

term "chronic Bright's disease" is frequently used in speaking of these cases. The fact that this law of the co-relation of the heart, blood-vessels and kidneys has been overlooked in the past, has led to much misconception, not only as to disease of the kidneys, but also disease of the blood-vessels and heart. When they are studied together it is found that often the earliest indication of disease of the one is found in disorder of the other. Chronic Bright's disease is not essentially a disease of the kidneys, although in the final catastrophe these organs are often chiefly at fault. Primarily it is a disease of the circulation in which the brain and kidneys, acting as it were as end-organs, first manifest symptoms.

A case which had been under observation for five years ended fatally by the involvement of the circulation of the brain, producing progressive stupor and finally coma, paralysis, and death. The kidneys at the time were apparently in good enough condition to have functionated fairly well for a much longer time. In this case the greatest care had been exercised in protecting the kidneys by diet, an

even temperature, and every other possible means, thus allowing the arterial disease an opportunity for its complete development. The same case, if less carefully guarded, would have progressed by repeated attacks of uremia, to a death by the development of anasarca and exhaustion. We have, then, the paradox that a person may die from Bright's disease with fairly good kidneys, this case illustrating the fact that the brain and the kidneys are both end-organs, and that in particular cases the brain may suffer more than the kidneys.

This point is important in considering the early symptoms in high-pressure cases. The kidneys are insensitive organs, rarely giving rise to pain, intermittent in their manifestations, and entirely removed from direct observation; for this reason disorder of the kidneys may reach a grave stage before it becomes a matter of consciousness. On the other hand, the brain, as the seat of consciousness, is highly sensitive to any interference with its functions. To a certain extent it is also capable of examination through the observation of the fundus of the eye, which is in

close relationship to the brain. It may be stated that the brain records at all times, in a more or less distinct manner, the condition of the circulation, and a careful study of the symptom-complex soon reveals which disturbances of the circulation indicate organic disease of the vessels and early Bright's disease. Attention and observation soon make this symptom-complex of extreme significance.

Even in cases in which chronic Bright's disease follows acute nephritis, the establishment of the chronic condition is characterized by certain detectable vascular changes. In cases of acute nephritis one watches the circulatory system with anxiety, because, when changes are established, the chance of complete recovery is diminished. In acute Bright's disease the heart is temporarily debilitated so that there is often established a blowing systolic murmur at the apex, and the profound anemia and nervous phenomena that accompany the disease may lead to other functional disturbances of the circulation. These must, however, be distinguished from the changes that take place in

the arteries which indicate the transition from subacute nephritis to the chronic general condition. The same change sometimes indicates the establishment of a chronic nephritis in cases of valvular disease of the heart that have been accompanied by prolonged congestion of the kidneys.

Though it is hardly to be supposed that cardiac hypertrophy can be established except by some cause acting for a considerable period of time, still it is often the earliest detectable sign of chronic nephritis. Abnormal arterial tension may for the moment be absent, either on account of treatment or for some other cause, but when physical examination shows distinct cardiac hypertrophy we suspect at once a high-pressure case of circulatory disease.

It is probable that an increased flow of urine found in early Bright's disease is due as much to increased blood-pressure as to any definite change in the kidneys. Loomis speaks of an increased frequency of urination as an early sign of Bright's disease, and this again may well be accounted for by increased secretion due to increased arterial tension.

Nose-bleed is another possible result of increased arterial tension, and may, therefore, indicate the beginning of Bright's disease. Another accompaniment of increased arterial tension is headache, due apparently to increased vascular tension in the head.

I would also like to class as one of the early disturbances of high-pressure cases, certain attacks of indigestion. These are due at this early stage to disturbances of circulation in the stomach, and are not to be confounded with uremic nausea.

High-pressure cases more often develop in an atypical than in a typical way, and even in their final fatal course may never present the symptoms that one would expect. The early symptoms are often an unhealthy look, loss of strength, and such disturbances of digestion as may be referred to simple weakness. The urine may only contain albumin at rare intervals, so that it would not be detected by anything save systematic observation.

It is fair to say that the early signs of impending changes in the blood-vessels also mean the early circulatory changes of Bright's

disease. The first signs of degeneration are manifested by disorder of function. The blood-vessels act as tubes to convey the blood to different parts of the body, but at the same time, through the muscular structure of their walls, they act as regulators of blood-pressure. This pressure-regulating function is an exceedingly complex one and controls the determination of blood to the different parts of the body as it may be most needed. It is this regulating function which first suffers when the tendency to high-pressure begins to show itself, so that irregularity of tension is the most important early circulatory indication.

We have traced those signs and symptoms in the circulation which precede, for a long time, the establishment of that condition known as chronic Bright's disease. The smaller arteries are attacked earliest, and these are the first to show disordered function. Increased arterial tension, or a tendency to it, causes irregularity of blood-pressure, and is early recognized by symptoms indicating irregularities of circulation in particular parts of the brain. This irregularity may give rise to tem-

porary unconsciousness, slight paralysis, or simply to clumsiness of a limb.

The typical high-pressure case as met with in practical work, is usually one which has gone on to its full development without observation or treatment. The patient presents himself because he has symptoms, or because on some occasion an examination has revealed the chemical or physical signs of the condition. The heart is found hypertrophied, the arterial tension high, and the urine increased. Careful questioning will elicit symptoms of disorder of the cerebral circulation as indicated by a subjective feeling of nervousness, headache, insomnia, or attacks of dizziness, or even threatened aphasia, and hemiplegia. The hypertrophied heart is compensatory, having been hypertrophied in order to meet the demand for high arterial tension, just as the heart in valvular disease is hypertrophied to meet the demand for normal arterial tension when it is working at a disadvantage.

So long as the arterial tension is maintained, the patient is not in danger in the direction of the circulation, but is, of course, liable to ac-

cidents due to injuries to the nervous system, or a sudden failure on the part of the kidneys. The circulatory danger arises from the exhausting condition under which it is carried on and the inevitable approach of the time when the tension can no longer be maintained, hence the vital importance of seeking out and relieving the underlying cause of this high arterial tension, and the futility, except as a temporary expedient, of treating the symptom itself as the primary disease by the prolonged administration of vaso-dilators.

## CHAPTER V

### THE MANAGEMENT OF HIGH-PRESSURE CASES

THE management of high-pressure cases is perhaps the most important topic of our whole subject, as it is also the one in which the greatest advance has been made in the knowledge of circulatory disorders.

The causes of high-pressure are all those circumstances which occasion a long-continued demand for hyperactivity of the circulation, also those conditions which interfere with the proper carrying out of the chemical operations in the body, whereby there remain in the circulation incomplete chemical products. The same chemical cause may arise in a different manner through an interruption of the work of the kidneys whereby toxic substances are retained in the blood. The latter two causes fall under the head of gout and Bright's disease. Certain toxins, as for instance those of the infectious diseases, probably only cause

high-pressure cases through primary damage to the kidneys.

The first principle of all treatment must be the removal, as far as possible, of the causes of the condition, hence the management of high-pressure cases must begin by the discovery and removal of the influence which has led to their development. Thus, a man who is intemperate with regard to alcohol must be cautioned against its use; the man who has assumed an unusual burden of responsibility in life must readjust his plans so as to lead a life free from anxiety and excitement. The patient who has habitually been addicted to the over-ingestion of food must be restricted as to his diet. The patient with damaged kidneys must be subjected to a regimen which will enable these organs to do their work properly.

A mistake that is often made is in treating these cases all alike and regarding them as primarily disease of the kidney. For instance, a patient with kidneys damaged by disease may often use alcohol in moderation with therapeutic benefit; the patient whose condition is secondary to mental strain may often be bene-

fited by the ingestion of food, and by a luxurious mode of life which is entirely contraindicated in the patient whose condition is that of the so-called gouty diathesis, or, as we have expressed it, secondary to the breaking down of the chemical functions of the body. So no hard-and-fast rules can be laid down for the management of high-pressure without regard to its origin. The influence of drugs is also a matter depending upon the nature of each case.

The distinction which we have drawn between high-pressure cases and low-pressure cases presents an immense advantage in the power of discrimination between therapeutic measures. Particularly is this true in regard to hydrotherapy.

The general statement may be made that warm bathing is indicated in high-pressure cases, and cold bathing only in primary low-pressure cases—with this distinction, however, that cold bathing is contraindicated in high-pressure cases, while warm bathing, and even hot baths, may be beneficial, and often are in low-pressure cases.

These facts are nowhere better illustrated than in the two great modern applications of hydrotherapy—the Nauheim and Brandt systems. In the former we are dealing with high-pressure cases, though frequently, indeed, in the stage of secondary low arterial tension. In the latter we are dealing with the primary low arterial tension of acute disease.

The beneficial effect of systematic warm bathing, preferably with the addition of salines, whether combined or not with resistance exercises, in high-pressure cases with a tendency to cardiac dilatation, is very striking. Equally striking is the injury observed from a persistence in taking cold baths by elderly people at the present time who fell under the influence of certain popular doctrines years ago, which entailed a Spartan regimen including cold baths and coarse food.

The Nauheim treatment is particularly applicable to this form of disease, no matter what its origin, and its great success, though supposed to be due to a direct action upon the heart, is really due to the correction of disorder of the arterial system, particularly in

cases in which there is a commencing secondary low arterial tension.

The baths are essentially tepid baths with the addition of saline ingredients which have an action upon the peripheral circulation.

The growth of this treatment, met as it has been at first with surprised incredulity, and later with blind faith, is now being analytically studied and is found to be applicable to many patients in many places without much complication of detail.

The characteristic Nauheim treatment as recommended by Schott is not really a very warm bath. It is never given above 95°, and even as low as 88° F. The presence of carbonic acid and the salines causes a distinct impression upon the skin.

The Schott treatment, therefore, must not be confounded with the valuable procedure of ordinary hot bathing in persons who have feeble circulation. The former procedure might be accompanied by certain dangers in persons with defective kidneys, while ordinary hot bathing with perhaps the addition of bicarbonate of soda has no such danger. Then

again, the characteristic exercises are an important part of the Schott method.

Concerning foreign health resorts Sansom makes the following wise remarks:

"The patient is apt to misunderstand the word 'cure' as applied to the treatment of the foreign health resorts, and invests processes there with a certain glamour. He prefers, it may be, the counsel of a prophet who bids him do some great thing, to the advice of a friendly doctor who has carefully watched the signs of his disease."

High-pressure cases are often met with in men who literally lead a life of high-pressure. The successful business man who overworks and worries, and who uses alcohol, is very apt to develop arterial changes and a tendency towards pathologic high-tension. To such persons, and indeed to many others, the necessity of periods of relaxation as a requisite to the maintenance of health is very great. The most foolish thing that any successful man can do is to work throughout the year without an adequate vacation, and it is a rather curious practical observation, even among professional

men, that, in the long run, the actual income of the year is not diminished by taking several months of travel and recreation. The improved morale, the wider view of the world, and the coming in contact with new people, more than compensates for the actual loss of income during the period of cessation of work. Any man whose work is not purely routine is the gainer by a sufficient vacation, and by devoting some attention to the question of pleasure and rest.

When health is considered, in view of our present knowledge of the progress of the circulatory degeneration which goes hand in hand with the advance of years, and which, as previously stated, is particularly liable to attack those whose lives are most successful, the matter of rest and recreation becomes one of evident importance.

Unfortunately, if the pursuit of pleasure be put off too long, the faculty of the enjoyment of a quiet life is lost. It is extremely important that each individual should develop interests during early life that may occupy him during periods of cessation of work, so that

if the time comes when he suffers from high arterial tension, and is ordered by his physician to travel and rest, he may be able to take an interest in the things of the pleasure-seeking world and not fret and worry through a period of so-called relaxation, only to return to business to find even that distasteful because of ill-health. Instances of this kind have been observed in which it seemed the part of humanity to allow such a man to "die in the harness," as it has been expressed, that is, there are certain cases of the high-tension type that have gone beyond the point where much is gained by a change of occupation. It is important, therefore, that high-tension cases be early recognized, so that proper attention may be given to the conduct of their lives, and the care of their circulation.

The effect of temperament upon the progress of high-tension cases is marked. A man with a naturally cheerful disposition who is active in the pursuit of pleasure, even though this be accompanied by the abuse of stimulants, suffers less from the condition of high arterial tension than does the individual with the same

physical ailments who is prone to mental anxiety and depression. The reason for this is probably a complicated matter of the reaction of the brain upon the vasomotor system.

It is certainly a fact that many men prone to conviviality go on living with this high arterial tension in the circulation, while others of a different temperament sink rapidly through the grades of cardiac hypertrophy, broken compensation, renal insufficiency, and circulatory failure, to death.

Hence, the one most important condition in the management of high-tension cases is the removal, if possible, of overwork, particularly mental work, of worry, and indeed, all demands that may put the nervous system under a strain.

The truth of this is remarkably shown by the occasional observation of a man who, having developed high arterial tension, cardiac hypertrophy and albuminuria during the course of an exciting and successful business career, has finally put his affairs in the form of an estate, and settled down to a life of ease and enjoyment of quiet pleasures. In such a man I

found the heart large, but not overactive, an entire absence of arterial high-tension, the kidneys doing their work reasonably well, and indeed, the whole condition showing a state not characterized by advancement. This is no fancy picture, but a matter of actual observation.

There are a considerable number of men in the position where they must choose between a few years under the conditions in which they are at present, and a good many more years under circumstances of less strain.

No condition is so easy to remove temporarily by treatment as high arterial tension. The administration of an efficient dose of one of the nitrites is as striking in its effect as any therapeutic measure in all medicine. The trouble is that the effect is but transitory, and that there are certain disagreeable by-effects, such as irritation of the heart, if the doses are too often repeated. For this reason, much judgment is necessary for the proper administration of the vaso-dilators in high-tension cases.

Some physicians give these drugs three or

four times a day, and flatter themselves that they are keeping down arterial tension. Others, who know better, give the drug every hour, and really succeed in relieving arterial pressure.

The prolonged treatment of high-tension must be principally hygienic, but while we have not any belief that a few doses of nitroglycerine during the day will permanently effect a lowering of tension, still, while other methods are being employed it is a useful procedure, as it relieves blood-pressure at intervals, and gives the circulation an opportunity to take advantage of anything that is gained by other measures. As a matter of fact, in the earliest stages of this condition, a few doses may for a considerable time counteract a decided tendency to arterial tension.

In the treatment of high-pressure cases we are confronted with the fact that while we are treating high arterial tension, the greatest danger to be feared is secondary low arterial tension. The problem is to remove from the heart the demand for the maintenance of high-tension in order to avert the time when,

through exhaustion, it cannot maintain even a normal pressure. The mere reduction of high-pressure by the dilatation of the peripheral arteries, when the demand on the part of the system for a high arterial pressure has not been removed, often results merely in an irritation of the heart.

This is often observed clinically when nitroglycerine is used indiscriminately and persistently in high-tension cases, particularly of the nephritic type. Quite frequently where a condition of irritation has come about, the substitution of digitalis will result in a calming of the circulation, and an apparent disappearance of tension that is surprising to those who have not tried this experiment.

The drug treatment of high-pressure cases must be managed by an intelligent observer who subordinates theoretic considerations to practical results.

The iodid of soda used persistently has a beneficial effect upon patients in whom there has been established a tendency to high-tension and progressive deterioration of the heart-muscle.

It has seemed to me, and my observations have been confirmed by others, that even in very bad cases of this kind, much advantage results from the use of this drug in this way.

Ordinarily it is prescribed in a solution of equal parts of iodid of soda and water, and given in doses of two to fifteen drops in half a glass of water after meals. It is a matter of experiment to determine how much each patient can tolerate. Ordinarily five drops can be taken over a long period of time, although a considerable number of patients can only take two or three.

# CHAPTER VI

## SOME OBSCURE SYMPTOMS OF CIRCULATORY DISORDER, WITH A CONSIDERATION OF THEIR SIGNIFICANCE

Not all symptoms of circulatory failure are comprised in dyspnea, edema, and visible congestion or anemia, though these are the cardinal indications. There are certain symptoms of obscure origin that are traceable to circulatory disease, and are only overcome when that is given proper attention.

In elderly people one of the most frequent and troublesome of symptoms is that of head noises. I have under observation at the present time no less than four patients who have suffered over long periods of time from noises referred to the ear, which they described as puffing or blowing sounds, and which have been extremely annoying. These patients had all been systematically and heroically treated for ear disease without benefit, but when the

circulation was properly controlled the noises became so slight as not to be complained of, and a good deal of the time not to be noticed.

These patients are usually found in the group of commencing secondary low arterial tension. The explanation of these sounds would seem to be the circulation of blood through badly filled blood-vessels in the neighborhood of the organ of auditory sensation.

There is no class of cases that has given greater satisfaction, because it is possible to relieve a condition that has caused much suffering, particularly at night.

Another obscure manifestation of circulatory disorder is the simulation of slight attacks of paralysis. These are often overlooked unless they are watched for. They consist of a temporary slight loss of power of a transient nature, on the right or left side of the body. The patient usually describes the attack as a "clumsiness" of a leg or an arm. If on the right side of the body there is sometimes a slight loss of power of speech, in that certain words are missing. The patient usually considers this a temporary failure of memory. These manifesta-

tions are the same as often indicate more serious disease of the brain with impending thrombosis. However, in many cases, attention to the general circulation will entirely remove the symptoms, so that it is hard to believe that the condition was purely local in origin.

There is a class of obscure symptoms of circulatory disorder which consists of pain in various parts of the body. How much of this is purely circulatory, and how much of it belongs to the gouty, rheumatic, and nutritional disorders that are common in the same class of patients, is often hard to determine. It is suggestive that these painful conditions arise at times of circulatory debility and improve when the circulatory disease is in abeyance. Attacks of sciatica of a persistent and troublesome nature are particularly apt to occur in patients commencing to suffer from secondary low arterial tension.

There is a really pitiable set of patients that might be mentioned here, though perhaps not quite logically. These are the patients who have developed a very painful and chronic neuritis subsequent to attacks of extreme circula-

tory edema of the lower extremities. It may be only a coincidence, but these have been among the most difficult patients to relieve that have come under observation in connection with the treatment of circulatory disease.

The obscure symptoms of circulatory disease would not be complete without a consideration of the things that may happen during the stage of high arterial tension. Nose-bleed of a troublesome character is a frequent occurrence, and in cases where one is puzzled to decide between primary and secondary low arterial tension, the history of a period during which nose-bleed was very troublesome may be of help. It is surprising how often this history is elicited from patients who come for the first time in the stage of broken compensation.

The number of conditions due to congestion secondary to general circulatory disease that are mistaken for diseases of local origin, is very great. The most striking of these is, perhaps, congestion of the liver.

This condition develops gradually, so that the blood becomes congested in the liver, giving rise to functional derangements of this

organ, and of the other organs of digestion. The liver is enlarged and tender on pressure, and the condition is often accompanied by very marked disorder of the stomach, on account of which it is frequently mistaken for primary gastric disease. That this is not the case is proven by the fact that the condition is relieved only when the circulation is strengthened.

There is a class of cases in which circulatory disorder is shown in its pulmonary effects. There is persistent congestion of the lungs, often with a tendency to the accumulation of serum in one or both pleural cavities. These patients may often have a fairly good systemic circulation and very obscure indications of cardiac disease. The interference is apparently with the function of the right side of the heart. Two patients of this character were watched over a long period of time, while the pulmonary congestion, involving repeated attacks of bronchitis and slight edema, rendered them incapable of work. The symptoms of circulatory disorder are obscure because so much more accentuated in the thoracic organs than elsewhere.

Circulatory disorder may also show itself in its effect upon the function of the brain by attacks of acute mania, or more often by the development of a chronic mania.

Changes in the arteries in elderly people are apt to be characterized by changes in disposition, by affections of the memory, and by impairment of judgment. That these symptoms are traceable to circulatory derangement is shown by the fact that their course is markedly affected by the treatment of the circulation.

Disorder of the circulation in persons past maturity is sometimes shown by so striking a manifestation as general convulsions. These patients are often supposed to be suffering from idiopathic epilepsy. However, the attacks are so promptly relieved by appropriate treatment directed to the circulation, which would have no effect whatever in epilepsy, that this may be eliminated from the diagnosis. Of course, there are relatively rare cases in which real epilepsy begins late in life.

A group of symptoms on the border line between neurotic and circulatory disturbances forms in its sum-total a large proportion of the

sufferings of humanity. Abnormal sensations in the extremities, numbness and tingling of the hands and feet, a feeling of formication extending up the legs and thighs, abnormal coldness of the hands and feet, cramps in the muscles of the legs occurring at night, and the tendency of the extremities to "go to sleep," as it is called—all these things may be pure neuroses, but often enough there is a circulatory element in their causation.

As in a preceding paragraph in this chapter, we may again suggest that the therapeutic test will decide how much of this is due to disorder of the circulation. Many times the symptoms disappear when the circulation is properly regulated. A few doses of nitroglycerine have stopped all complaint of cold extremities in many patients of this type. The possible severity of pain due to interference with the circulation is well shown in cases of embolism of the extremities in the course of circulatory disease. No one who has observed this accident will doubt that pain of the severest type may be due to interference with the circulation.

# CHAPTER VII

## THE MANAGEMENT OF SECONDARY LOW-PRESSURE CASES

THE treatment of low arterial tension which is secondary to long-existing high-tension conditions has two elements—first, the correction of circulatory errors by the action of drugs which have the power to modify physiologic forces in various parts of the circulatory circuit, and, second, the restoration, as far as possible, of the health of the tissues upon which derangements of function are often founded.

The attention in diseases of the circulatory apparatus is too often concentrated upon the first. In instances of temporary embarrassment, or of extra demands on account of complicating diseases, this first element becomes of supreme importance, but in the long-run it is the second element upon which success in the care of circulatory disorders is dependent.

In this connection it is important to differentiate between the symptoms and the disease. Dropsy of the dependent portions of the body is a symptom which does not always demand treatment. If of moderate degree, and dependent upon well-understood causes, it is often the part of good judgment to undertake the second element of treatment, neglecting for the time being the symptom, the removal of which would require intervention in the physiologic activity of the heart, such as might neutralize treatment directed to the circulation as a whole; indeed, there is often much harm done in such cases by violent attacks upon symptoms.

Most writers on circulatory disease have passed over with scant consideration the management of cases with general edema and steadily progressive symptoms, which, if not checked, uniformly lead to a fatal termination. It is unscientific to disregard these cases in considering various forms of treatment at length, dismissing them with a single clause. This is frequently done in speaking of the Nauheim treatment, progressive cases being usually spoken of as unsuitable. There is al-

ways the possibility in any particular case that we may be mistaken in our estimate of it, and the patient is entitled to the treatment even at the risk of discrediting the system by the limitation of results because of the severity of the case.

As physicians engaged in the general practice of medicine, who must do our best for those who place themselves under our care, it is our duty to study the best plan for every stage of a case, and to contest skilfully and hopefully every sign of the progress of disease. In the whole range of circulatory disease there is no condition which will so tax the knowledge and patience of the physician as the management of this low arterial tension which is secondary to high arterial tension.

The importance of recognizing this class of cases is very great, because the methods of treatment which tend to the relief of the condition are not those which give the most satisfactory immediate symptomatic results, or those which are applicable to low arterial tension which has not been preceded by high arterial tension.

It is true that with many of these patients we are justified in the use of means which temporarily give relief and symptomatic results.

In primary low arterial tension the heart-muscle is in a position to recover its tone if depleted by acute disease, or to develop a compensatory hypertrophy if overtaxed by defective valves.

In secondary low arterial tension the heart has already for the time being exhausted its power of compensatory hypertrophy, and, while the tendency to resistance in the arteries persists, there is no adequate response on the part of the heart.

Little is gained symptomatically in extreme cases by the use of vaso-dilators, because the blood-pressure is already low. Little is gained by digitalis, because the heart-muscle is not in a position to respond. The combination of drugs of the digitalis group with drugs of the nitrite group produces a certain amount of symptomatic response, but in the end does not produce permanent results unless combined with measures that will hold the advantage

gained. Excessive drugging is a mistake. A single large dose of digitalis at night is often better than divided doses. A good fluid extract put into a capsule and swallowed at bedtime, the dose being determined by experiment, has often proved very satisfactory. Attention to the digestive organs is often of the utmost importance. Milk is often badly borne and should be replaced with the most nutritious food that will agree with the patient.

As often as possible these patients should be put upon a regimen directed to the improvement of nutrition and to the healthfulness of the body in general, hydrotherapy in the form of warm saline baths, a nutritious diet without too much regard to theories as to gout or disease of the kidneys, and exercise in the open air up to the point where dyspnea interferes.

We are dealing often enough with dangerous conditions, and it is not possible to compare the result in a particular case with what it would have been under other circumstances. A man must be of limited experience indeed who has not seen such a patient do better when disregarding advice that planned treatment of

such a condition by too long rest in bed and a diet too restricted. In cases of threatened circulatory failure those remedies that have a demonstrated physiological action on the circulation are tools to be used for the correction of defects of action while the hygienic measures mentioned above are repairing any shortage in vitality. Each drug should be exhibited by itself and ready mixed tablets or combinations reserved for less serious cases. A good plan is to divide the day into periods of one or more hours and state definitely when each dose is to be taken. Thus the circulation is regulated by various adjustments much like a machine. Vaso-dilators in the evening are often well borne and useful in the same case in which they are harmful in the morning.

The vitalizing effect of a change of climate, a change of food, and of massage and exercise should always be remembered. Under wise management a patient, the subject of progressing circulatory failure, can many times be rescued from a situation which seemed at first most discouraging.

# CHAPTER VIII

## GENERAL CONSIDERATIONS

In the previous chapters the author has systematized his conclusions in the interpretation of blood-pressure as affecting the heart, brain, kidneys, and general circulation.

In order to obtain an expression of opinion, there was published, just previous to the writing of this little book, a series of short articles in various medical journals. These elicited enough discussion to show that the subject is one in the mind of many general practitioners. Among the articles, one entitled "The Importance of Treatment in the Early Stages of Arterial Degeneration"* was commented upon by Dr. Beverley Robinson, of New York, and others, as being a true picture of the condition described. The points brought out were that the term degeneration of the arteries is a better

* *Medical Record*, April 2, 1904.

term than arteritis, arteriosclerosis or endarteritis, because it is less definite and can be made to include functional as well as material vices. This condition is the result of the many causes which act in opposition to the tendency of life to go on without loss of quality or impairment of power—in other words, it is the failure of repair, and the failure in the action of the mechanism for the automatic correction of irregularities in the circulation.

The light thrown upon this condition by pathology is extremely unsatisfactory because we often find a most advanced arterial sclerosis without marked symptoms, and we find marked symptoms with hardly appreciable physical changes. The degeneration of function is more striking during life than degeneration of tissue. So long as we have to deal, then, with living people, the perfection or otherwise of the processes of life is the important element. This element is entirely beyond the view of the microscopist.

The failure of circulation may be due to functional causes as much as to a condition represented by appreciable structural change.

The teaching of modern science has been too much in the direction that phenomena can be wholly explained by structure. This is not true of the working mechanism of the human organism, nor indeed is it true even of mechanical things.

I was much struck recently by a description of his own case as given by a gentleman who has achieved success in life through the able manner in which he has managed a railroad. He is suffering from circulatory failure, and said: "I think I am like one of the old engines on my railroad—about ready for the scrap-heap. You may be able to patch me up and keep me going for a little while, but you cannot make me new again." He said that when an engine first came out of the shop it could do two hundred miles a day, and at the end be just as good as at the start. After a while there would be a little leak in one of the valves and it would have to go to the shop to be repaired. Later on another valve would leak, and then there would be trouble with the fire-box. When this once began, though each time the engine came out of the shop it would

appear to be all right, it would always be going back again, and at the end of a hundred miles one might always expect something to be wrong. He said further: "I employ a master mechanic to overhaul the engines every morning, and in this way we manage to keep them going, even though they are old; but there always comes a time when repairs do not pay, and then they are sent to the scrap-heap." This was a simile more true than pleasant.

There is something about a piece of machinery that has borne the stress of hard usage that is very like the behavior of the human body under the same conditions. It pays in the long-run to buy new machinery, and it would certainly pay to get a new body if that were possible. A new automobile can be managed and kept running by one of little experience, but to keep an old one running requires the knowledge of an expert.

Machinery can be replaced, but for the human being there is only one body as far as we know, so we must make the best of it. For this reason the study of the repair of the failing human organism and the discovery of all

those methods by which it may be kept smoothly running are well worth our best efforts.

The human organism is a much better machine than any invented by man. It has within itself arrangements for the repair or concealment of the earlier manifestations of many serious affections. In a way this is a disadvantage, because the earlier signs of degeneration are only to be detected by the trained perception of a skilful observer. This is particularly true of the circulation. The earliest sign is an irregularity of tension in the arteries, and this goes on to a pretty constant high arterial tension. The inherent forces conceal the defect whenever they can and bring about a compensatory hypertrophy of the heart.

This is the time when it is a pleasure and satisfaction to the physician to step in, and by proper régime and treatment regulate the arterial disorder, and the causes which are leading to it. Once in a while there is a patient who will submit to regulation before the appearance of conscious symptoms. The great majority of such cases, however, have come un-

der my care only at the stage when the hypertrophied heart, having wearied of the burden of maintaining the high arterial tension, has become feeble and probably dilated. Such was the case of the patient who compared his state with that of the broken-down motor. He presented the picture of cardiac failure—the heart dilated, with blowing murmurs, a feeble and irregular pulse, shortness of breath on the slightest exertion, albuminuria, and anemia. It was a case in which medical aid was sought only after the reparative powers of the body had exhausted themselves. Two years, or even one year earlier, the process might have been checked, so that the scrap-heap's day would have been much longer postponed.

To make an estimate, which must be purely a guess, the expectation of life is in inverse proportion to the postponement of treatment after the earliest signs of irregularities of arterial tension due to the changes of degeneration.

In a paper read before the New York County Medical Association* entitled "Ergot in Sur-

* Annual Meeting, April 18, 1904.

gery," Dr. Alfred T. Livingston, of New York, said: "In this connection I commend to your perusal and careful consideration a brief but most valuable and pertinent paper by Dr. Louis F. Bishop, of your city [see current volume of Journal A. M. A., page 820]. The paper in question reads as follows:

"The Relation of Nature's Provision for Heart Stimulation and Control to the Use of Cardiac Drugs in Acute Disease.

"Before plunging into the indiscriminate use of drugs which have the property of causing the heart to beat more strongly, it is well to consider what provision has already been made in the same direction by the body itself, and also what is the precise object of such intervention in a particular case.

"The heart is wonderfully responsive to the demands of the body when subject to exertion or disease. In acute conditions, stimulation in the sense of urging the heart to expend more energy, is seldom demanded except in sudden emergencies. Fever is a great heart stimulant, as is also inflammation.

"The use of the term 'heart stimulants'

in reference to drugs that are used in the course of disease with the idea of assisting the heart and preventing the failure of its powers when they are most needed, is a crude employment of words, and has led to much misconception. Who would think of whipping a horse that was already struggling under an unusual load, or further opening the throttle of an engine when it was going too fast?

"The fact is that we have but few heart stimulants in the true sense of the word, and we hardly ever use these. The only time when drugs are used with the direct purpose of stimulating the heart is in sudden emergencies. Then we avail ourselves of the fact that many drugs which are useful as heart regulators also possess the property of temporarily stimulating the heart. The best heart stimulants, however, such as ammonia, ether, and nitrite of amyl, are poor regulators, and the best regulators, such as digitalis, strophanthus, and iodid of soda, are poor stimulants when quick action is needed.

"The whole question of heart stimulation needs revision in its clinical aspect. A good

beginning could be made if the term 'stimulant' were dropped entirely and the idea of regulation substituted. A hundred lives are saved by the judicious control of the over-stimulation which results from disease, where one is saved by direct stimulation as such. The only excuse for the use of heart stimulants is that they have been misnamed, and are useful as regulators.

"The misconception of the importance of stimulation as an element in recovery from disease has unquestionably led to much harm. When in a very sick person it is found that the pulse is slow, reflecting only the weakness of the patient, one should rather rejoice than otherwise. Circulatory failure does not, as a rule, take place in this direction. Primary low arterial tension without excessive rapidity is not ordinarily dangerous if let alone. Such a heart may carry on its work successfully, while if injudiciously drugged, it may be so exhausted that if the stage of the rapid and feeble heart be reached, there may not be reserve force enough to carry the patient through the disease. I have repeatedly seen cases in which, on account of simple feebleness of the

pulse in acute disease, the patient had been drugged beyond measure, with the result that the heart and pulse were showing most erratic action, but in which, the occasion for the original stimulation having passed, the withdrawal of all drugs soon restored the heart action and pulse to normal.

"Failure of the heart most frequently takes place in the direction of increased rapidity. This is probably due to the failure of a very radical element in the living organism known as inhibition. In connection with the heart, the nerves which conduct this impulse from the great nerve centers which seem to be the center of life, are well known. The same influence in one form or another affects every organ and tissue of the body. On it depends co-ordination in every vital process. An instance of its failure to act is seen in increased patellar reflex, due to cutting of the path of connection between the brain and the muscles of the thigh.

"So increase in rapidity of the heart in disease tending to dissolution is a very radical thing, and is only successfully combated by measures influencing vitality itself, such as im-

proved nutrition of the whole body, improvement of the nervous system at large, and the removal of those things which are acting contrary to the interests of the whole physical economy. I can remember as a medical student, bringing to bear, when opportunity afforded, every known heart drug in the attempt to control the rapid and feeble heart action of dying patients, and I could not understand at that time why so little was accomplished.

"In acute disease, while there is life there is hope of the restoration of the patient to health, so one must strongly advocate the most strenuous efforts to the very last to avert the tendency to death; but there are certain limits beyond which drugs having a direct influence on the heart are no longer useful. If the patient is to be saved it must be done by the restoration of the inhibitory force by measures directed to the restoration of the whole bodily economy. Hence the value of strychnin, of hydrotherapeutics, of nutrition, and above all, of sleep, and the removal of exhausting influences.

"Interesting as they are, and important, the consideration of the mechanics of the circula-

tion must give way to the consideration of the patient himself as an individual. There is a trite saying that a man is as old as his arteries, and in acute disease it may be said, as a rule, that the heart is as good as the man.

"The moral of it all is that in acute disease the question of cardiac drugs is a matter that must not be lightly considered."

In *American Medicine,* April 23, 1904, was published a brief note entitled: "The Importance of Considering the Element of Vasomotor Instability in Estimating the Significance of Irregularity of Cardiac Rhythm," which read as follows:

"The frequent discrepancies between the heart-sounds as heard by the stethoscope and the pulse as determined by palpation must have impressed all observers. It has been a matter of surprise that hearts, which, by their sounds, seemed to be doing good work, were often accompanied by a pulse giving a poor impression, and, on the other hand, cases showing irregularities of the heart-sounds have been associated with a pulse showing a fair degree of regularity.

"When it is remembered that, in the light of evolution, the heart is constructed of the same elements as the blood-vessels, and is only a differentiation of the circulatory tube, and when it is appreciated that not only the blood of the heart, but the blood of the whole circulation, is surrounded by a muscular envelope that maintains its pressure, it can easily be seen that in palpating any portion of this blood-containing system, the variations in pressure will be a complex of the whole envelope, and not merely of its strongest portion.

"The vasomotor system is much more liable to disorder than the heart, and the heart is able to compensate for a good deal of misbehavior on the part of the vessels, but in compensating it often appears to be misbehaving itself. Thus, one may fall into the error of predicating disease of the heart-muscle when the trouble really is a functional derangement of the blood-vessels. In many of the cases that are strikingly benefited by the Nauheim treatment the results are undoubtedly obtained by a restoration of the peripheral circulation, and

the relief of the heart from a struggle to compensate for it.

"Not only clinical but pathologic study confirms the fact that diseases of this class, including myocarditis and nephritis, have their origin most often in degeneration of the blood-vessels, at first functional, and then organic. The coronary arteries of the heart become involved and then the heart-muscle suffers. The vaso-vasorum of the blood-vessels suffer, and then the larger vessels, so even in the early stages of circulatory symptoms, the relationships should be appreciated and the hygiene of the peripheral circulation becomes a matter of serious supervision."

This elicited the following reply from Dr. Albert Abrams, of California (author of "Diseases of the Heart; Their Diagnosis and Treatment"), who, under the title: "A Clinical Method of Determining the Vasomotor Factor in Blood-Pressure," * said:—

"Dr. L. F. Bishop, in a contribution on 'The Importance of Considering the Element of Vasomotor Instability in Estimating the Sig-

* *American Medicine*, May 28, 1904.

nificance of Irregularity of Cardiac Rhythm,' published in *American Medicine,* April 23, 1904, directs attention to a significant clinical paradox, viz., the discrepancy often existing between the heart-sounds and the pulse—in other words, the vigor of the one cannot be gauged by the strength of the other. My own observations tally with those of Bishop. I have frequently noted among arteriosclerotics and others, that a high blood-pressure is often coupled with the local evidence of cardiac incompensation. When the heart-tones are weak, increased blood-pressure can never indicate a vigorous heart-action, and in estimating the vigor of the latter, blood-pressure is of subsidiary value only. When high blood-pressure coexists with cardiac enfeeblement, a vasomotor factor is concerned in the maintenance of the former, this increase in the peripheral resistance of the blood-vessels acting as a prop to the enfeebled heart. In other words, the arterial system serving the objects of compensation acts as a subsidiary heart, which in turn facilitates the circulation of blood. In this way, as I view it, the nervous system, through

the vasomotor nerves, may compensate an impaired myocardium.

"I have accumulated sufficient data to warrant recommending the following method for determining the vasomotor factor in the clinical measurement of blood-pressure. In my observations, the Riva-Rocci instrument was employed. After determining blood-pressure, according to the conventional method, the patient is instructed to inhale amyl nitrite from a bottle, after which procedure the blood-pressure is again estimated, and the difference noted. The arm-piece of the instrument need not be removed until the investigations are completed. The patient must be instructed not to practice forced breathing while inhaling amyl nitrite, as observation has taught me that this physiologic act alone will reduce blood-pressure, and thus negative the clinical findings. Sufficient amyl nitrite must be inhaled to induce its physiologic action, viz., slight duskiness of the face, fulness in the head, and relaxation of the blood-vessels. The average effect of inhalation of the drug in the normal subject is to cause a slight increase of

blood-pressure, varying from 2 mm. to 20 mm. The primary effect is to depress slightly the blood-pressure, but it rises at once. I am inclined to conclude that in the average healthy individual inhalation of amyl nitrite relaxes the arterial walls by eliminating the vasomotor influence, thus bringing into play the veritable cardiac pressure. My observations, extending over a period of one year, permit me to formulate the following conclusions:

"1. Blood-pressure is an expression of action of two chief factors, ventricular force and vasoconstriction.

"2. Inhalation of amyl nitrite dissipates the vasoconstrictor factor, and brings into play the ventricular force which is the real factor to be encouraged in a failing heart.

"3. The vasoconstrictor factor may and does compensate myocardial inadequacy, for it is essential in most cardio-arterial diseases for the blood-pressure to be maintained to afford better nutrition of the heart, and to augment arterial elasticity as a means of establishing the blood circulation.

"4. The recognition of the myocardial and

vasomotor factors in blood-pressure guides us correctly in the administration of cardio-tonics.

"5. In the individual endowed with cardiac health, the removal of the vasomotor factor by inhalation of amyl nitrite causes an increase in blood-pressure, whereas the converse condition causes the latter to fall and the degree of reduction is proportionate to the degree of cardiac enfeeblement. In other words, the high blood-pressure in myocardial disease is maintained by an augmented tonus of the vasomotor center. Thus the blood-pressure may fall from 240 mm. before, to 180 mm. after, inhalation of amyl nitrite in arteriosclerotics with enfeebled hearts. Even this reduction in blood-pressure is not low enough to correspond with the tones of the feeble-acting heart, hence one is constrained to conclude that the action of the amyl nitrite does not suffice wholly to eliminate the vasomotor factor.

"6. The execution of the foregoing maneuvers in estimating heart vigor is by no means comparable to a correct method of cardiac auscultation, although the latter method does not indicate how much of the cardiac force may be

attributed to increased peripheral resistance; cardiac auscultation, in conjunction with the sphygmomanometer and the inhalation of amyl nitrite, constitutes the ideal method for eliciting the real condition of things.

"7. In estimating blood-pressure the sphygmomanometer only gauges the force of the left ventricle, and to determine the sufficiency of the right ventricle, auscultation of the pulmonic sounds and a physical examination of the lungs are alone adequate.

"I have encountered a number of individuals with very high blood-pressure, and who demonstrated no cardiac anomaly, yet the blood-pressure remained the same after as before the inhalation of amyl nitrite. In about half of these individuals the urine was light in color, of low specific gravity, contained a trace of albumin, and was excreted in increased quantities. Albumin often disappeared when the blood-pressure was spontaneously lowered, to reappear when the pressure rose, hence the albuminuria in such instances could be correctly designated as the albuminuria of high blood-pressure."

With reference to "Constitutional Low Arterial Tension,"* the following was published: "It will be found that there are many patients who give evidence, on the most casual examination of the circulation, that the tension in the arteries is very slight, and in some this will be found a constant condition. It is surprising how little tension there can be in the radial pulse without the patient suffering from any symptoms of circulatory disease.

"This low arterial tension in otherwise apparently healthy individuals, is undoubtedly a departure from the normal. It may be due to an unusual relaxation of the peripheral circulation which makes it possible for the heart to do its work with but little effort. Some of these patients are generally feeble, lacking in nerve force and unequal to strains. Others, however, seem to respond to demands for physical or nervous effort, and when so responding there is an improvement in the tone of the circulation.

"When seen for the first time during some

* *New York Medical Journal and Philadelphia Medical Journal*, June 11, 1904.

acute affection this condition may give rise to apprehension on the part of the physician as to the outcome of the illness for which he has been summoned. When, however, the patient can be watched from year to year and is seen to get along perfectly well, even though there is this lack of tone in the circulation, the physician comes to realize that with that individual it is a physiologic condition.

"There is another form of low arterial tension that is of much more importance, and that is the low arterial tension which succeeds the high arterial tension of chronic Bright's disease. Here we have to deal with a most serious complication of the disease. It means that the circulation is no longer maintained by the heart. Thus, it may be stated that low arterial tension may exist in certain individuals without great significance, but that if it has been preceded by high arterial tension it is a factor of grave import. With this condition we have nothing to do in the present discussion, but rather with low arterial tension that is a reflex of a constitutional condition.

"Experience has shown that nothing is gained with these individuals by the use of drugs to increase arterial tension. It is quite possible to make the pulse for the time being approximate the normal; indeed, this often happens spontaneously when the heart and circulation are physiologically stimulated by exercise or fever.

"The condition is, in all probability, due to an inherent defect in the nervous system, whereby it does not exercise the proper control over the blood-vessels. The same patients who suffer from this low arterial tension are very apt to manifest other symptoms of defective nervous control, and the removal of the underlying condition will bring about an improvement in the circulation.

"The most important element of treatment is systematic exercise. These patients are often dependent for their well-being upon regular physical exertion. Often they feel much better if they can take a brisk horseback ride every day, or some other form of stirring exercise. There are other cases in which it is found that iron and arsenic improve the condition when it

becomes very marked. In still other cases very hot baths take the place of vigorous exercise and improve the tone of the circulation. It should be remarked that this is a secondary effect, because, if the circulation be examined immediately after the bath, it will be found to be more relaxed than usual.

"Although one would expect beneficial results from cold bathing, it is found by experience to be unsatisfactory in cases of constitutional low arterial tension. Such subjects do not react, and the effect is not satisfactory.

"These observations refer to a class of patients who are not suffering from any definite disease, but who realize that they are not the same as other people. They have probably been told that they are suffering from a variety of diseases, according as the phenomena were supposedly traced to one or the other organ. To them may be applied the rather trite remark that they are suffering from a condition rather than a disease. Such patients are fortunate if they come under the care of a practitioner who will appreciate the condition and manage it

properly. The worst thing that can happen is, that there should be repeated efforts to cure supposed disease by different men succeeding one another."

"Prostration of the Circulation" * was the title of a paper which read as follows: "This term is used in reference to the circulatory system as synonymous with neurasthenia in relation to the nervous system. Neurasthenia is undoubtedly founded upon a malnutrition or an exhausted vitality of nervous tissue. Prostration of the circulation is founded upon the corresponding elements, but as the heart and blood-vessels are much more open to direct examination than the nerves, there are signs as well as symptoms. As in neurasthenia both the brain and the peripheral nerves participate in the disease, so in prostration of the circulation the heart and blood-vessels are involved. Neurasthenia and prostration of the circulation are two conditions that have many correlations. In neurasthenia there is always a certain amount of vasomotor disturbance, though there are many

* *Buffalo Medical Journal*, May, 1904.

cases in which the circulation is entirely normal.

"In prostration of the circulation there is often much depression, but disturbances of sensation have a real foundation in alterations of the blood supply, and there are many cases in which there is not the slightest touch of neurasthenia.

"I have suggested the name, prostration of the circulation, to cover those cases in which the terms myocarditis and arterial degeneration are too harsh, just as we would not like to speak of neurasthenia as insanity. We have for a long time needed a word to cover those cases which present disturbance of function, and which are perfectly capable of complete recovery, though as often as not they go on to the manifestation of organic disease.

"The following case which I saw recently will illustrate the point I wish to make. The case was that of a woman who had worked very hard all her life, had become run down, and began to find that it was difficult for her to carry on her occupation. She presented the

appearance of health; there were no evidences of kidney disease, and no history of dissipation. She complained of some shortness of breath on exertion, particularly when there was any sudden demand upon her muscular system. She was not in the least neurasthenic, for these conditions were perfectly real in their existence. The arterial pulse was soft and compressible; her heart-sounds were feeble, and there was a soft systolic murmur at the apex.

"It seemed to me a simple case of circulatory prostration, and one that was capable of complete recovery by a suitable course of treatment. It is not easy to describe the differentiation of such a case from a case of real myocardial degeneration, or a case of circulatory disease in which the kidneys may eventually be the principal sufferers. However, there is this about it—namely, that in myocarditis, irregularity of force and rhythm is a very constant symptom, and in commencing arterial degeneration careful search should be made to discover some signs of irregularity of cerebral circulation. Cases of prostration of the circulation show marked hepatic symptoms, principally due

to the stagnation of the circulation in the liver. In other words, in simple prostration of the circulation the blood current is feeble, but regular. In myocarditis and arterial degeneration it is irregular."

# CHAPTER IX

## THE ESTIMATION OF BLOOD-PRESSURE AND THE USE OF THE NITRITES FOR ITS MODIFICATION

THE estimation of the condition of the circulation usually represented by "feeling the pulse" stands for a very important procedure in the routine of the practice of medicine, and is the one element of a physical examination that is probably never neglected in any case, or in any country. For this reason the estimation of the pulse, while it has not always lent itself to the most scientific classification, still to the individual physician represents a remarkable amount of experience and observation, checked by the findings of subsequent events. Now, while many physicians are unable to express in words what they feel in the pulse, still, very often indeed their conclusions are correct.

The tactile estimation of relative blood-pressure as determined by the experienced

touch, and checked by clinical symptoms, is usually correct, on account of this high degree of training. There is a possibility that some of this great skill of the profession might be lost if instrumental observation should possibly take the place of direct examination, just as we have lost skill in measuring fever. However, the introduction of instruments of precision far outbalances the benefits of the skill created by their absence.

In this connection the question is: How may technical skill in clinical pathology be made available to the profession at large?

It will be noted that so far little has been said as to the actual measurement of blood-pressure in the vessels. The extensive consideration of this is left to works devoted to this particular branch of physical exploration. It is undoubtedly true that the systematic instrumental measurement of blood-pressure by various instruments will eventually lead to important clinical results.

As remarked in the first chapter, it is the difference in pressure between the place where the blood is stored and the place where it is re-

quired, together with the element of resistance in the intervening blood-vessels, that determines the competency of the circulation.

The instruments and skill for the quantitative measurement of blood-pressure are still not in the possession of the majority of practitioners. It is enough to have considered at the present moment the philosophy of those cases in which there is little room for difference of opinion as to the existence of high or low pressure. In order to bring this branch of clinical observation, as well as others, within easy reach of my fellow practitioners engaged in the general practice of medicine as distinguished from those engaged in teaching and pure research work, I propose in the near future to establish in a physicians' office building a laboratory of clinical medicine where may be obtained the use of instruments and the services of those recently trained in modern methods of clinical pathology, so that all may have the same facilities now enjoyed only by the few physicians whose practice justifies the maintenance of an independent laboratory and staff of assistants.

The necessity for such a laboratory will

always be felt by that great body of physicians who, having originally been fairly trained in the clinical methods of the time of their tutelage, have become preoccupied by their work, and do not feel like acquiring skill in newly evolved technical matters. The possession of this technical skill is the best capital the beginner in practice has, and in a clinical laboratory such as I propose it could be made available for those who have the clinical necessity for its use. Particularly is this important in relation to the subject of the observation of blood-pressure, because the conditions involved are not truly represented by the patients who are congregated in hospitals and clinics. Disorders of blood-pressure, while found in all classes, present particular phenomena among the upper grades of society.

Bearing upon this question we would quote from an article by Drs. Ruth and Rider, entitled "Laboratory Aids in Clinical Diagnosis," which appeared in the *Journal of the American Medical Association,* May 7, 1904.

". . . The solution of the problem lies in co-operation. With an expenditure of $10,

NOTE.—The "Laboratory of Clinical Observation" was founded 1904, at 616 Madison Ave., New York.

and an arrangement with a laboratory within twenty-four hours' ride, any physician can have laboratory advantages at his disposal. All that is needed is a few glass slides, some culture tubes, platinum needle, alcohol lamp, Thoma-Zeiss white cell pipette, Tallquist hemoglobinometer, and a book on technic, how to obtain and forward material for a leucocyte count, hemoglobin estimation, bacteriologic examination of blood, urine, exudate, or whatever else may be desired. One member of the community of physicians can go to the expense of fitting a laboratory and becoming proficient in technic. His neighbors can either share the expense and go there to make their examinations, or, what is better perhaps for both, have one who has the time and taste do the work for all. Practice makes perfect, and better observations would be secured by such a plan. A mutual agreement should be made as to the sharing of expense, and by a very small personal outlay a town possessing a faculty of only six or more physicians could have a sufficiently well-equipped laboratory and afford enough work to enable one or more of their

number to become reasonably expert. We have not the time to elaborate this plan, but simply wish to state how, by means of harmony and mutual aid, it would be possible to bring the means of diagnostic precision within the reach of practically all the profession.

"In many of the larger cities municipal laboratories have been established, and have done much good work, especially in dealing with the epidemic and contagious diseases. Being municipal laboratories only, they reach but a small proportion of the profession. It is not unlikely, in view of the good work done by the city laboratories, that the State will eventually place at the disposal of the general profession an adequate number of well-equipped laboratories that would not only offer technical aid in general diagnosis, but would require that their services be employed in all cases that might have a bearing on the health of the general public. It must of necessity be some time before any generally efficient State aid can be expected, and meanwhile the profession must rely on their own efforts to obtain laboratory aid in diagnosis."

The other point that we wish to make in this chapter is the necessity for greater conservatism in the use of vaso-dilators in certain cases of cardiovascular disease. In the career of every form of treatment there are several stages. The first is discussion, then, skepticism having been overcome, adoption. The second is intelligent application in the light of previous discussion and the consequent general information. Third, the routine use of an accepted treatment as a matter of course in a particular disease.

When Brunton applied amyl nitrite to the treatment of angina pectoris, he achieved a signal triumph in therapeutics. Not less was the triumph of the more gradual application of the nitrites in general to the treatment of vascular spasm. These were first well used by those who had witnessed their development and were familiar with their philosophy and limitations. Unfortunately the student coming later upon the field of medicine, and finding the nitrites in general use for vascular disease, jumped naturally to the conclusion that they were the remedies *par excellence* and used

them in a routine way in the treatment of these cases. The observation of this fact makes it seem useful at this time to emphasize the necessity of some conservatism in this matter. It is a trite saying that we should always treat the patient and not the disease, meaning by this that we must carefully recognize the exact physiologic and pathologic conditions present, and so influence them as to bring about the cure of disease. Patients differ widely in their behavior under the nitrites, and for that reason every case requires physiologic study to determine the amount of drug necessary and how it should be applied.

There is no more important function of the physician than the early recognition of that tendency to degeneration and death that comes prematurely to so many of the human race. This shows most often in arterial changes, one of the earliest symptoms of which is alteration in blood tension. The tension of the blood-vessels in health is maintained at an even point through the action of the unstriped muscular tissue in the walls of the blood-vessesls. The heart is a part of the

circulatory tubes, and differs only in arrangement and degree from the mechanism of the rest of the circulatory path. It contains unstriped muscular fiber as do the blood-vessels, and an arrangement of valves as do the veins. Its muscular action is rhythmic, while the muscular action of the blood-vessels is only slightly so. Both are subject to the control of the nervous system. It is in the disordered action of all these muscles that the first signs of degeneration appear. The muscles in the vessels act badly, the muscle in the heart is irritated, and the result is tension. To apply vaso-dilators without also instituting hygienic measures to reduce the irritability of the heart and restore the disordered or exhausted nervous system, is to overlook an important element in the problem of cure.

The necessity for the use of vaso-dilators is diminished in proportion to the intelligence and success attending these accessory measures. In Bright's disease there is probably some substance circulating in the blood that irritates the muscular coats of the vessels and causes contraction. This, with the physio-

logic attempt of the heart to carry on the circulation, again brings about high-tension. When high-tension antedates the onset of nephritis it may well be supposed that the tension has something to do with the production of nephritis.

A physiologic increase of blood-pressure is caused whenever there is nervous, muscular, or physiologic exertion.

Prolonged nervous strain, such as that met with in an exciting business career, or in prolonged dissipation, keeps up a tendency to tension that is particularly apt to lead to arterial degeneration. Muscular action is less prone to produce damage, and probably does so only in rare instances of long training and severe contests of strength. The reason for this is that exercise is accompanied by natural dilatation of the arterial circulation, improved nutrition, and relief afforded by perspiration. The physiologic activities of the body are usually accompanied by too slight a stimulation of the circulation to count for much in health, but are worth considering in disease.

In the case of a person suffering from ab-

normal tension it is especially important to do away with mental strain and responsibility. Such a person should not indulge in violent exercise, but is benefited by slow exercise. Food should be moderate in amount, taken at frequent intervals. Sugar and alcohol should be done away with entirely if possible, and meat used only in limited amount.

When the vaso-dilators are given it is to produce a definite physiologic effect which is capable of being appreciated by the observer. The dose required to produce this effect differs widely in different individuals and under different circumstances. In a large number of cases they are now so given that no effect whatever is produced. Crude therapeutic thought is responsible for this. The idea is conceived that the nitrites are good for kidney- and heart-disease, and so they are administered with the hope that the patient may be benefited thereby. If improvement takes place the medicine receives the credit, whether it has done its work or not. The word "conservatism" means more than caution, more than small dosage. It means the working out of the possibilities of

the remedy and its application in such a way as to fulfil its broadest mission, so that it may not be wasted or abused—wasted when used in non-active doses, and abused when used too often, or in too great quantity. With the vaso-dilators a careful regulation of the dose is of vital importance, for their final action may be dilatation and paralysis of the heart through a complete breaking down of that great power called inhibition which moderates all muscular activity.

When nitrites are used it is also of the utmost importance that the preparation selected should be reliable. I have known patients to take for a long time tablets supposed to be nitroglycerine which were subsequently found to be inert. When no benefit is obtained in conditions in which nitroglycerine is clearly indicated this may be fairly suspected. As a test, one of the tablets should be given to a healthy person, who should immediately feel the throbbing in the head due to the dilated blood-vessels and the stimulation of the heart. If no effect is felt, a new preparation must be sought and this tested. The 1 per cent. solution of glonoin is probably

more reliable, but is not nearly so convenient for patients as the tablet.

Cases must be studied from time to time by the withdrawal of these drugs, and by the substitution of other drugs of a different class. Particularly is it important in every such case to know from actual observation the effect of digitalis in such doses as bring about distinct physiologic phenomena.

But few diseases can be treated by specific measures, and cardiovascular disease is particularly remote from such an ideal. The end which drugs accomplish is to so control the circulation as to tend to benefit the condition of the tissues, or to prevent the condition of these tissues from working injury to the body as a whole. The management of cardiovascular disease is like the running of an intricate machine. The physician must study the machine itself and learn all its resources. He must know the use of every tool, and the effect of the turning of each screw. It is no abuse of the privileges of the physician to study his cases therapeutically by testing from time to time the effect of different classes of drugs,

though he return after each trial to the original plan of treatment. It is the height of arrogance to assume that his inductive reasoning can plan for each case a permanent course of management. Such action will only lead to humiliation and disappointment. How exasperating it is when for a long period of time, on theoretic grounds, we have abstained from the use of such a drug as digitalis to find some time or other that our patient has taken it through the advice of the corner druggist and has received appreciable benefit from it. Of course, we know very well that the corner druggist had no right to experiment, but perhaps the risk was worth taking after all.

There is a particular form of pulse in which nitroglycerine is not as valuable as a number of other drugs. This is a high-tension pulse with persistently rapid heart-action. In these cases I have sometimes seen the greatest benefit from the use of digitalis. Nitroglycerine has a twofold action in stimulating the heart and dilating the blood-vessels. Digitalis has a twofold action in slowing the heart and contracting the blood-vessels. Theoretically digitalis

would not act in these cases, but practically in a case of nephritis with a high-tension and rapid pulse, digitalis will often show its controlling action upon the heart in greater degree than any of its other effects, and in that way bring about a slower pulse with less apparent tension. At the same time digitalis will clear up congestion of the kidneys and cause a better secretion of urine.

Even when tension does exist in cardiovascular disease with nephritis, it should be realized that some tension may be desirable. As time goes on in such a case, the greatest danger to be feared is a too great lowering of the blood tension with its accompanying congestions and effusions. In the presence of symptoms indicating disturbances of cerebral circulation, such as numbness or awkwardness of one of the extremities, or slight difficulty in speech, the vaso-dilators are imperatively needed. Sodium iodid has also an undoubted power to postpone paralytic attacks due to the plugging of blood-vessels.

A word as to the possibility of recovery from cardiovascular degenerative disease. The heart

symptoms are those of myocarditis, and the kidney symptoms those of chronic nephritis. The tendency of the blood is to become of poor quality. With a properly planned regimen and the possibility of carrying it out, and with careful medication and other therapeutic measures, the heart may recover its tone so that all symptoms of degeneration will disappear, and the kidneys may settle down to do their work according to a particular plan, but well enough for the maintenance of health.

It is hard to prove the regeneration of kidney tissue, though the physiologic hypertrophy of one kidney when the other is removed leads to a belief in its possibility. Certainly there are many persons passing a large quantity of urine of low specific gravity, and with a slight trace of albumin, who maintain year in and year out signs of health. Their hearts, blood-vessels, and kidneys have readjusted themselves, and though bearing the scars of disease are carrying on the functions of the body in a satisfactory manner. I have pictured this condition because it is extremely interesting to decide in these cases how much

we should intervene with drugs to alter the heart-action or relax the blood-vessels. It seems to me that in the absence of symptoms sodium iodid will accomplish the best purpose, and that the use of the nitrites should be limited.

The hypertonicity of the arteries found as a part of nature's attempt to compensate for a failing heart muscle and present in many cases of secondary low blood-pressure must be distinguished from high blood-pressure. The contraction of the arteries disappears upon the recovery of the power of the heart to fill them with blood.

## CHAPTER X

### THE BLOOD-VESSEL TONE-MAINTAINING FUNCTION OF THE BRAIN

THE maintenance of tone in the muscular coats of the blood-vessels is so essential to the continuance of life and health that, when it fails, death follows in a very few moments. The capacity of the hollow organs that contain the blood, when completely relaxed, is so great that the blood in the body can only fill them to the extent of one-third. It is evident that the complex movements of the blood, constituting the circulation, cannot be carried on in a system of tubes that are only one-third filled. The circulation is, therefore, dependent not only upon the muscular contractions of the heart, but also those of the blood-vessels. In the course of evolution from the lower to the higher animals, there is found in the earlier stages a simple tube, and this gradually be-

comes more and more changed until in its course there are developed special collections of muscles, known as hearts, and when we get to the higher animals we find the greatly differentiated single organ, as in man.

So, while, of course, in man the heart is relatively of great importance, still the muscles that remain in the blood-vessels are absolutely essential to the maintenance of the circulation. In the control of the muscles of the heart and blood-vessels there comes into play a complex arrangement of nerves and nerve centers that is only secondary in its awe-inspiring perfection to the machinery of the intellect itself.

As we trace the development of the circulation from the lower forms of life up through the scale, we find that the control moves closer and closer to the central nervous system. In the higher forms of animals a tone-maintaining function is easily traced to the medulla, and the author believes that in man, at least, an important part of this function is found in the cerebral hemispheres.

It is well known that there is a tone-maintaining influence originating in the motor areas

of the brain that presides over the tonicity of the voluntary muscles. When a stroke of paralysis occurs, due to damage to the part of the brain that presides over the motion of a limb, that limb is paralyzed with regard to voluntary motion, but at the same time there occurs a relaxation, a loss of tone, in the blood-vessels that causes swelling. This suggests the fact that the involuntary muscles were likewise involved in a loss of tone, and would seem strong evidence of this blood-vessel tone-maintaining function. Not only may local blood-vessel tone be affected by changes that occur in the brain, but also the general tonicity of the whole circulatory system. In all brain conditions we look for changes in the peripheral circulation. Emotion may cause a rapid rise of blood-pressure. It is said that insane asylums are full of high-pressure cases due to cerebral excitement. In cerebral neurasthenia the blood-pressure is apt to be low.

In advocating the recognition of a blood-vessel tone-maintaining function of the brain it is not necessary to minimize the importance of the center in the medulla, whose activities in this

direction are so well known. It is only necessary to believe that the activity of this center is dependent upon stimulation received from the brain. A recognition of this function of the brain, which exercises a general control over a vessel tone, and therefore over blood-pressure, makes it much easier to understand many important disorders of the circulation and the benefits of certain plans of treatment experience has proved of the greatest value.

It explains why exercise of the voluntary muscles has so good an influence over disorders of the tone of the involuntary muscles. It makes clear why resistance exercises have vindicated their right to a place in the treatment of disease of the heart. It also reveals the development and points the way to treatment of a disease, the importance of which is becoming more and more recognized every day, and which we will discuss in the next chapter,—Hypertonia Vasorum Idiopathica.

# CHAPTER XI

## HYPERTONIA VASORUM IDIOPATHICA

THIS is *par excellence* the disease of the present day, and is looming up as of more and more importance in proportion as it is better understood. The time cannot be remembered when successful men were not stricken down in the midst of their activities by apoplexy or so-called heart failure. Of late years, it is increasingly common for those men and women who play the most prominent part in the world, and carry the heaviest burden of responsibility, to develop finally disorders of the arteries of the brain or of other vital organs, resulting on the one hand in apoplexy, or on the other in Bright's disease. We have attributed these breakdowns too often to chemical causes arising from disorders of the digestive system, or we have regarded them as primarily disease of

the kidney, developing in some mysterious way. Too often has alcohol been blamed when in reality it was hardly a factor in the case. Why should it be that persons preëminent for the use of their brains, and singled out for the heaviest responsibilities, suffer in the direction of the circulation so much more than those whose occupation is of another character? The reason is to be found in the effect of mental strain in exaggerating that tone-maintaining function of the brain that was discussed in the previous chapter.

Let us trace the development of such a case, resulting in an attack of apoplexy. A composite picture, drawn from the mental concept of this disease, tallies almost line by line with many concrete examples. The patient is a man of good family history, inheriting sturdy qualities from an ancestry that has developed strength through the successful contest with the difficulties of the development of a new country. He has been well educated, and has led a healthy and active youth. From the very beginning he has been a worker among his fellows, and spurred on by one success after

another, by middle life he has attained a position of importance and usefulness. Now his qualities have been recognized, and one burden after another has been laid upon him. He has become a factor in government, in business, in intellectual pursuits, and in philanthropy. Such a man, unmindful of the fact that he is past middle age, and that the body no longer has the recuperative power of youth, continues his work unceasingly, without those relaxations that attract men of a lighter turn of mind. The man feels perfectly well, but a change has taken place in the machinery of his body. The influence from the central nervous system, which maintains the blood-vessels in a proper state of tonicity, has become exaggerated through the overflowing of the mind strain, and the blood no longer circulates with ease. Now it is hard for the heart to keep the blood in proper circulation, but without any manifest symptoms it becomes enlarged and still carries on the work. The two factors of arterial contraction and cardiac hyperactivity result in high arterial tension. This in turn results in structural damage to the blood-vessels

in the brain, the kidneys and elsewhere. Unconsciously, the man is living in constant danger. Some day there arises some incident in the man's career that leads to an unusual degree of worry or mental strain, and there develops a tendency to inflammation in the already damaged blood-vessels of the brain, and the blood clots and stops the circulation, most likely in the speech center on the left side, and another prominent man has fallen victim to an attack of apoplexy. Sometimes the picture is varied and one of the arteries that supply the heart substance with blood is stopped, and the man drops dead in his tracks; or in another case the kidneys gradually give out. Not infrequently the abdominal arteries show the first indications by terrific digestive disturbance causing great distention of the stomach with wind and marked irregularity of the heart. This is my mental concept of hypertonia vasorum.

Even after any one of these serious accidents much can be done for a man made of such good stuff, but how much more satisfactory would be the prevention of such an

accident by proper medical treatment and a suitable regimen.

I would like to register a protest against those who decry the use of drugs in circulatory disease, because in all medicine there is no condition in which proper drug treatment is of greater value, and none in which, to my mind, its usefulness seems more easily demonstrated. The remedies must, however, be used with appreciation of the fact that they are to regulate an active mechanism that is always changing in its demands, and that the one needed at one time may be contraindicated a little later.

This implies very careful medical supervision, particularly when the case first comes under treatment. By a process of re-education of physiological processes control of function becomes easier and easier, and as the patient becomes familiar with his tendencies, the physician can in a measure yield control. The details of treatment must be worked out for each individual with due regard to the relation of blood-pressure, heart disease and blood-vessel damage.

LANE




MEDICAL LIBRARY

Gift
San Francisco County Medical
Society.